

GMC 8022

from Version 814



GMC 8022 E

from Version 814



Data Sheet

Gas Measurement and Warning

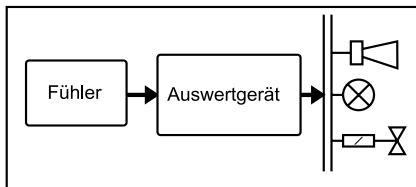


Application

The evaluator units GMC 8022 and GMC 8022E in conjunction with sensors with 4-20 mA output signals have the following functions:

- Measurement and display of gas concentrations.
- Monitoring and warning of the presence of these gases.
- Triggering protective measures to counteract a rise in the concentration of gases.

Description



A gas measuring and alarm system consists of the following components:

- Evaluation system
- Measurement sensor
- Controllable devices such as:
 - Ventilators
 - Solenoid valves
 - Horns
 - Warning signs

Product features

- Two versions:
 - GMC 8022: for assembly in standard control cabinets
 - GMC 8022E: 19" rack model
- 2 measurement channels
- Concentration display
- 2 alarm stages and additional horn output.
- Microprocessor technology provides numerous functions and simple operation
- Verification of alarm signals without test gas.
- Fault monitoring for:
 - Power failure
 - Computer defects
 - Wire breaks / short circuits in sensor leads
- Potential-free relay outputs for:
 - Alarms 1 and 2
 - Horns
 - Faults

How it works

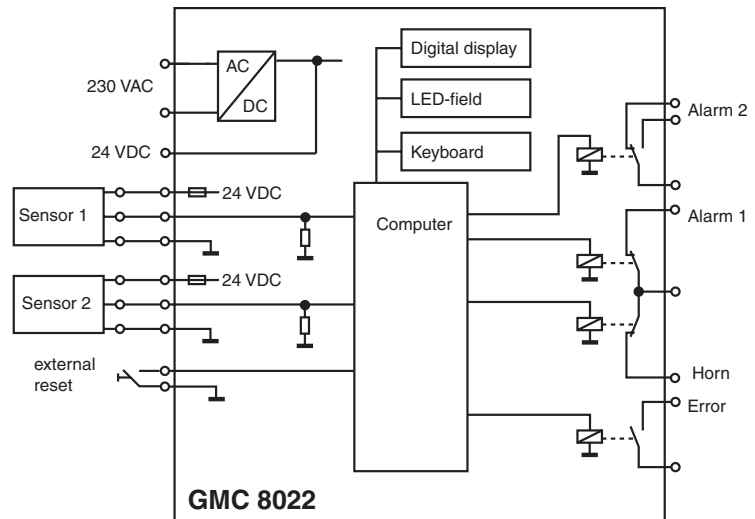
When the system is switched on, a lamp test is carried out. All LEDs illuminate for two seconds. Then the display shows the current software version. To suppress a false alarm when it is switched on, the system only starts monitoring ("Auto") after a delay of 30 seconds. The display cycles between the current concentrations at the two measurement points. The sensor being displayed is indicated by the appropriate LED illuminating. As soon as a sensor reaches alarm stage 1 or 2, the appropriate alarm LED blinks. When the selected alarm delay time has expired, the appropriate alarm relay is activated. At the same time the alarm LED becomes continuously illuminated. Because each alarm stage has adjustable hysteresis, an alarm stage is only cancelled when the current concentration has fallen below a second threshold. This also applies to Alarm 2 if the system has been programmed to be "non-saving". In the other case, Alarm 2 remains saved and can only be cleared by pressing the Reset button. Depending on how it is programmed, when alarm stage 1 or 2 is exceeded, a horn relay output is activated. This can be cancelled immediately by pressing the Reset button. Every time a new alarm is triggered, the horn is immediately switched on again. In addition, an LED illuminates to show that the horn is switched on or off. There is also the option of permanently displaying the concentration of a particular measurement point (Stop mode). With the 19"-rack version, GMC 8022E, the 4...20mA sensor signal can be emitted continuously by means of an additional module. The system continuously monitors whether the connection lead to a sensor is in order. An error signal is sent as soon as a wire break or a short circuit is detected. The fault LED "Err" for the affected measurement point illuminates and the error-signal relay is activated.



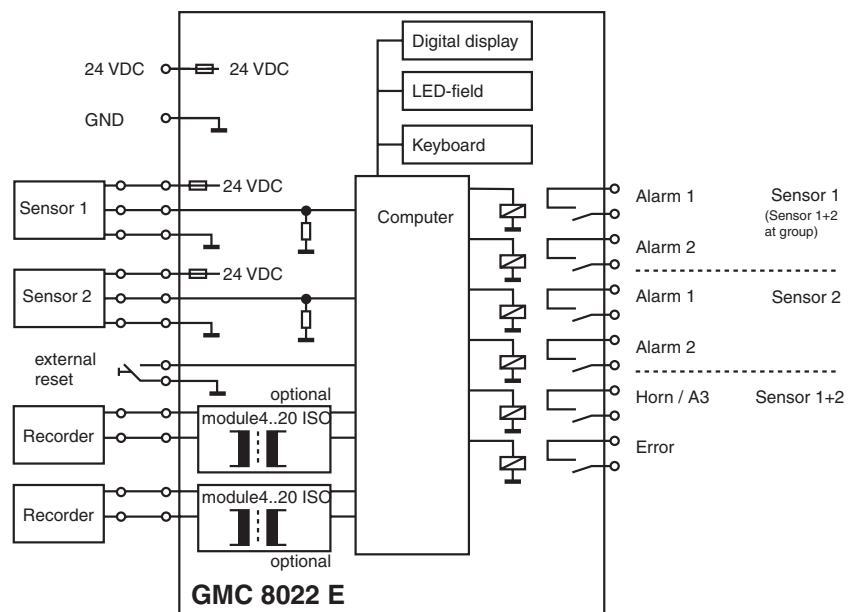
How it works

If the supply voltage is no longer adequate for the unit - or fails completely (mains failure) - it goes into error mode and the power-LED switches off. A lamp test can be carried out at any time by pressing the right-hand button. The system's alarm signals can be tested without the need for test gas. To do this, the sensors are disconnected internally from the unit to enable individual alarm simulation. Sensors with a special calibration signal (ExDetector / Exmonitor series) automatically activate alarm suppression to prevent false alarms during calibration of these sensor types. During programming, the system data (horn on Alarm 1 or 2; Alarm 2 saving or non-saving, alarm triggering of a sensor signal on undershoot or overshoot) are first displayed as a code. The system data can be changed. Next the number formats are defined for each measurement point. Now the parameters measurement range, limits for triggering and switching off alarm stages 1 and 2, and an alarm delay time can be set can be set for each individual measurement point. All additional menus such as programming, alarm simulation, or the suppression of alarm signals can only be accessed by entering a special password.

Block wiring diagram



Note: Relay shown in alarm status



Note: Relay shown in alarm status



Technical data

Type designation	GMC 8022	GMC 8022E
Channels	2	
Suitable sensors	Series Exdetector, Gasmonitor, Exmonitor	
EU-Type-Examination Directive 2014/34/EU (Performance certification)	BVS 03 ATEX G 007 X	
Functional Safety	SIL 1, SIL 2 (for details see separate information)	
max. distance of sensors / cable cross-section	approx 500 to 1000 m, depending on unit configuration and sensor used. See data sheet of the used sensor.	
Sensor interface	linear input 4...20 mA, Shunt 226 Ohm to GND sensor power supply: 24VDC (20...27,6 VDC), SELV, max. 100 mA for each sensor	
Alarm levels	Group outputs for measuring channel 1 + 2: ● alarm 1 and 2 ● horn ● error	● alarm 1 of each sensor ● alarm 2 of each sensor ● horn of sensor 1 and 2 ● error of sensor 1 and 2
Outputs	floating group alarm ● alarm 1: make contact ● alarm 2: changeover contact ● error: break contact ● horn: make contact	● single / group alarm relay with floating contact - alarm 1: break contact - alarm 2: break contact ● group alarm relay with floating contact - error: break contact - horn: break contact
Make-break capacity of output relays	230 VAC, 2A 30 VDC, 2A	50 VAC, 1A 75 VDC, 1A
supply voltage	230 VAC, 50...60 Hz 24 VDC (21,7 ... 28 VDC) SELV for connection to usual alternating current- / continuous current - inverter	
Current input without sensors at 24 VDC	110 mA	● 150 mA ● 260 mA with connected 4...20 modules
Power input	14W / 20VA	
Operating temperature range	0...+55°C (General applications) 0...+40°C (Functional Safety SIL1, SIL2)	
Operating humidity range	0 ... 90 % rH	
Environment	● Not for use more than 2000m above sea level ● Protect from direct sunlight	
Storage temp.	-25...+55 °C	
Display elements	● LED's for each measuring channel: - alarm 1 and 2 - error - displayed sensor ● ready ● horn ● digital indication for concentration and programming data	
Resolution of concentration display	measuring range end value 100 - 999: 1 measuring range end value 10,0 - 99,9: 0,1 measuring range end value 1,00 - 9,99: 0,01	
Operating elements	3 keys for: ● horn and alarm reset ● guidance through menus ● programming	
Reset input	make contact for looping the internal control voltage 24 VDC, SELV	
Run-in time	30 s	
Update rate	<440 ms (analog outputs, relay outputs)	
Analog outputs		optionally equipped with 2 pcs. 4...20 mA output cards
Analog output data		4...20 mADC, SELV, resolution 0,078 mA, max load 250 Ohm


Functional safety

	Single channel use	Redundant application
Safety function	Measuring function for explosion protection or Measurement of toxic gases or oxygen	
Measuring range	Depending on application and detectors connected	
Operating temperature range	0 ... 40 °C	
SIL Capability Hardware	1	2
SIL Capability Software	1 Version 814 according DIN EN 50271 (BVS 03 ATEX G 007 X)	
Proof Test Intervall	1 year	
Type of device	B	
HFT	0	1
SFF	83,28 %	
β Faktor	—	5 %
PFD	$7,43 \times 10^{-4}$	$3,78 \times 10^{-5}$
λ_{du}	$1,65 \times 10^{-7}$ (pro h)	
λ_{dd}	$5,85 \times 10^{-7}$ (pro h)	
λ_{su}	$2,24 \times 10^{-7}$ (pro h)	
λ_{sd}	$1,48 \times 10^{-8}$ (pro h)	
MTTR	24 h	
Period of use	Recommended: 15 years	

Application conditions

The SIL values of the controller in conjunction with the determined error probabilities are only valid when the following application conditions are met: The detectors connected must emit error signals of 3 mA as "Error low" and 22 mA as "Error high", which will be considered as failure of the appropriate sensor. When Bieler + Lang 4-20 mA sensors are used, this is automatically ensured. Sensors and the control unit must be commissioned by the manufacturer, Bieler + Lang, or by an authorised representative. The ambient conditions specified in the manufacturer's documentation, e.g. with regard to temperature, humidity and pressure must be observed. The sensors connected must be regularly maintained by a qualified person and calibrated with a certified test gas in accordance with the manufacturer's instructions. Maintenance and calibration should be carried out in accordance with Instruction Sheet BGI 518 of the German employer's liability insurance association (= Instruction Sheet T 023 of BG-Chemie).

Repeat testing (proof test)

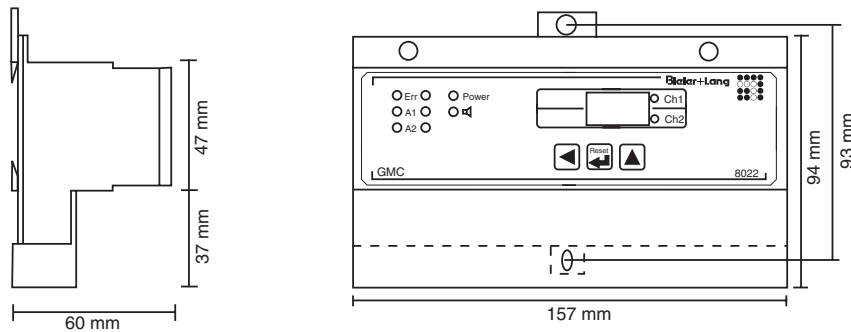
The annual proof test for the control unit consists of the correct calibration of connected sensors with a certified test gas, and checking the appropriate measurements at the control unit. In addition the adjustable parameters e.g. type of gas and alarm thresholds must be displayed and compared with the target values. All relays in the controller must be checked manually for correct switching.



Mechanical data

● **GMC 8022**

Design	suitable for installation in standard field distribution or other suitable housings
Protection class	IP30
Terminals	1,5 mm ²
Enclosure material	plastic (Lexan)
Weight	approx 750 g
Dimensions (H x W x D)	94 x 157 x 60 mm



● **GMC 8022E**

Design	19" plug-in unit
Connection	32-pin plug connector DIN 41612
Enclosure material	front panel, aluminium
Weight	approx 290 g
Dimensions	19" plug-in unit 12 TE, 3 HE

Safety of the unit

Compliance with the following standards guarantees the highest degree of safety:

- GMC 8022 and GMC 8022E:
EN 50270 Electro-magnetic Compatibility
EN 61010-1 Safety requirements for electrical equipment for measurement, control, and laboratory use

EU Type Approval Test Certificate

EU Type Approval Test Certificate for flammable gases BVS 03 ATEX G007 X

- **EN 60079-29-1**
Explosive atmospheres - Gas detectors. Performance requirements of detectors for flammable gases
- **EN 50271**
Electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen. Requirements and tests for apparatus using software and/or digital technologies

When used with sensors for measuring combustible gases in areas in which there is an explosion hazard, this control unit is subject to Directive 2014/34/EU

**Accessories**

- Horns
 - Warning lights
 - Solenoid valves
 - Central emergency power supply
 - For GMC 8022E:
 - Power supplies
 - 4-20 mA output module
 - Relay boards RK1, RK2 for switching mains power up to 2A
-

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We reserve the right to make technical changes!

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